DOCUMENT RESUME

ED 211 342 SE 035 961

AUTHOR	Fox, Kevin
TITLE	Algebra I Level-Individual Instruction of X and Y Variables of One Mixture Problem.
PUB DATE	79
NOTE	15p.; Contains occasional marginal legibility.
AVAILABLE FROM	Kevin Fox, Box 344, Elmhurst, NY 11380-0344 (200 tests plus answer key $4.00; each tape $6.00; 200 copies of page 1 $4.00; complete paper copy of tape, test and answer key $1.00).
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Algebra; Answer Keys; Evaluation; *Individualized Instruction; Instructional Materials; *Mathematics Instruction; Mathematics Materials; *Problem Solving; Secondary Education; *Secondary School Mathematics; Tests
IDENTIFIERS	Heuristic Methods; *Word Problems

ABSTRACT

This document is designed to aid students who wish to comprehend the algebraic problem-solving process for mixture problems. The instruction set was designed to be low stress, patiently delivered, and easy to follow. It was set up to be accompanied by a 25-minute audio cassette tape. The content of this document and the tape is directed to the analysis of one problem. The material includes a completed formula page for the mixture problem, a test, an answer key, and a nine-page transcript of the audio tape. The formats of the Title I Methods of Individual Instruction and the Cooperative Methods (in-school) of Individual Instruction were followed. (MP)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

TITLE: ALGEBRA I LEVEL-INDIVIDUAL INSTRUCTION OF X AND Y VARIABLES OF ONE MIXTURE PROBLEM.

by Kevin Fox

ED211342

Descriptors:

Algebra I Level-Individual Instruction-Mixture Formula Concepts-Title I Method of Instruction-Cooperative Method of Instruction (In-School-Instruction)-Audio Cassette Analysis of One Mixture Problem-Paper Copy of Cassette Tape-Test and Answer Key supplied.

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Kevin Fox

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Content listed in Numerical Order:

1. Test and Answer Key supplied
2. Completed Mixture Problem analyzed
3. Expressions explained many ways
4. Algebraic Problem solving process
5. Mixture Formula concepts
6. Recognize the question
7. Understand the question
8. Analyze the answer
9. Proof explained many ways
10. Two unknown values analyzed
11. The words "let" and "then" are analyzed
12. Introduction to the "world of thought"

Abstract:

This individual-instruction-set consists of one audio cassette and paper copy. This instruction-set was created for students who want to comprehend the algebraic formal problem solving process of Mixture Problems. This instruction-set is: (1) low stress, (2) patiently delivered, (3) easy to follow. Symbols are continuously taken from the Completed Mixture Formula and are examined in a thoughtful manner. The audio cassette tape is approximately 25 minutes long-the paper copy of tape contains 9 pages. The format of the "Title I" Methods of Individual Instruction was followed. The format of the Cooperative Methods (in-school) of Individual Instruction was followed. Complementary Test and Answer Key supplied.

SE 035 961

Two-hundred (200) tests plus answer key costs $4.00. Each tape costs $6.00.
Two-hundred (200) copies of page 1 costs $4.00.
Complete paper copy costs $1.00 (contains paper copy of tape, test and answer key).

The above can be obtained by writing to: KEVIN FOX, Box 344, Elmhurst, New York, N.Y. 11380-0344
(Make check payable to: KEVIN FOX)

Copyright © 1979

INSTRUCTIONS AND INFORMATION

1. Pages 4 to 12 contain the same information that is contained on the tape.

2. The content of this booklet (and tape) is directed to the analysis of one Mixture Problem.

3. The Mixture Problem is the following:

   A baker added flour worth 40-cents per pound to flour worth 20-cents per pound. How many pounds of each did he use to make a mixture of 25 pounds to sell at 32-cents per pound?

4. Page 1 contains the completed formula for the above Mixture Problem.

INSTRUCTIONS FOR PLAYING THE AUDIO CASSETTE TAPE:

(a) Position page 1 for comfortable reading.

(b) Place tape in cassette.

(c) Press "play".

(d) IMPORTANT: While you are listening to the tape, you should constantly be looking at page 1.

(e) After completing the tape, you should then complete the test which is contained on page 2.

(f) The Answer Key is contained on page 3.

A baker added flour worth 40-cents per pound to flour worth 20-cents per pound. How many pounds of each did he use to make a mixture of 25 pounds to sell at 32-cents per pound?

(A) Let x = the number of pounds of the 40-cent per pound flour.

(B) Let y = the number of pounds of the 20-cent per pound flour.

(C) Then $40x + 20y = 32(25)$

(D) $x + y = 25$

(E) $20x + 20y = 20(25)$

(F) $(40x + 20y) - (20x + 20y) = 32(25) - 20(25)$

(G) $20x = 300$

(H) $\therefore x = 15$

(I) $y = 10$

(J) Answer: 15 pounds of the 40-cent per pound flour.

(K) 10 pounds of the 20-cent per pound flour.

(L) Proof: $\$.40(15) + \$.20(10) = \$.32(25)$

(M) $\$6.00 + \$2.00 = \$8.00$

(N) $\therefore \$8.00 = \$8.00$

Another check for proof:

(O) Value of 15 pounds of flour at 40-cents per pound = \$6.00

(P) Value of 10 pounds of flour at 20-cents per pound = \$2.00

(Q) Total value..... = \$8.00

(R) Value of 25 pounds (mixture) at 32-cents per pound = \$8.00

The following five points of information are given in the Mixture Problem:

1. The total weight of the mixture is 25 pounds.
2. The total price of the mixture is \$8.00.
3. The price of each pound of the mixture is 32-cents.
4. The mixture contains two kinds of flour; one kind of flour costs 40 cents per pound; the other kind of flour costs 20 cents per pound.
5. The total mixture contains 25 pounds @ 32-cents per pound.

TEST FOR: ALGEBRA I LEVEL-INDIVIDUAL INSTRUCTION OF X AND Y VARIABLES

INSTRUCTIONS: a. Read the Completed Mixture Problem below the double dotted line.
b. The information below the double dotted line is the data base for the twenty questions in this test.
Read the data base carefully before you answer the twenty questions.
c. Place each answer in the box following each question.

1. What is the dollar value of 40x in line"C"?
2. What is the dollar value of 20y in line"C"?
3. What is the weight value of the number 25 in line"C"?
4. What is the money value of the number 32 in line"C"?
5. What number does the symbol x represent in line"C"?
6. What number does the symbol y represent in line"C"?
7. How many pounds of flour does the symbol x represent in line"C"?
8. How many pounds of flour does the symbol y represent in line"C"?
9. What is the meaning of the following mathematical symbol .'. ?
10. How many kinds of flour are used in the Mixture Problem?
11. What kind of money units are used in the following equation:
40x + 20y = 32(25)?
12. What are the three symbols in the following equation that represents pounds: 40x + 20y = 32(25)?
13. What are the three symbols in the following equation that represents money: 40x + 20y = 32(25)?
14. What line is the result of multiplying line"D" by 20?
15. What line identifies the subtraction of both sides of line"E" from both sides of line"C"?
16. What two lines contain the answer?
17. What are the names of the two variables?
18. Line"G" was divided by what number?
19. Line"D" was multiplied by what number?
20. How many pounds does the number (25-x) represent?

.....

.....

A baker added flour worth 40 cents per pound to flour worth 20 cents per pound. How many pounds of each did he use to make a mixture of 25 pounds to sell at 32-cents per pound?

(A) Let x = the number of pounds of the 40-cent per pound flour.
(B) Let y = the number of pounds of the 20-cent per pound flour.
(C) Then 40x + 20y = 32(25)
(D) x + y = 25
(E) 20x + 20y = 20(25)
(F) (40x + 20y) - (20x + 20y) = 32(25) - 20(25)
(G) 20x = 300
(H) .'. x = 15
(I) y = 10
(J) Answer: 15 pounds of the 40-cent per pound flour.
(K) 10 pounds of the 20-cent per pound flour.
(L) Proof: $.40(15) + $.20(10) = $.32(25)
(M) $6.00 + $2.00 = $8.00
(N) .'. $8.00 = $8.00

Another check for proof:

(O) Value of 15 pounds of flour at 40-cents per pound = $6.00
(P) Value of 10 pounds of flour at 20-cents per pound = $2.00
(Q) Total value..... $8.00
(R) Value of 25 pounds (mixture) at 32-cents per pound = $8.00

The following five points of information are given in the Mixture Problem:

1. The total weight of the mixture is 25 pounds.
2. The total price of the mixture is $8.00.
3. The price of each pound of the mixture is 32-cents.
4. The mixture contains two kinds of flour; one kind of flour costs 40 cents per pound; the other kind of flour costs 20 cents per pound.
5. The total mixture contains 25 pounds @ 32-cents per pound.

ANSWER KEY FOR: ALGEBRA I LEVEL-INDIVIDUAL INSTRUCTION OF X AND Y VARIABLES

1. What is the dollar value of 40x in line"C"? $6.00
2. What is the dollar value of 20y in line"C"? $2.00
3. What is the weight value of the number 25 in line"C"? 25 pounds
4. What is the money value of the number 32 in line"C"? 32 cents
5. What number does the symbol x represent in line"C"? 15
6. What number does the symbol y represent in line"C"? 10
7. How many pounds of flour does the symbol x represent in line"C"? 15 pounds
8. How many pounds of flour does the symbol y represent in line"C"? 10 pounds
9. What is the meaning of the following mathematical symbol .˙. ? therefore
10. How many kinds of flour are used in the Mixture Problem? two
11. What kind of money units are used in the following equation:
    40x + 20y = 32(25)? cents
12. What are the three symbols in the following equation that represents pounds: 40x + 20y = 32(25)? x, y, 25
13. What are the three symbols in the following equation that represents money: 40x + 20y = 32(25)? 40,20,32
14. What line is the result of multiplying line"D" by 20? Line"E"
15. What line identifies the subtraction of both sides of line"E" from both sides of line"C"? Line"F"
16. What two lines contain the answer? "J" and"K"
17. What are the names of the two variables? x and y
18. Line"C" was divided by what number? 20
19. Line"D" was multiplied by what number? 20
20. How many pounds does the number (25-x) represent? 10 pounds

A baker added flour worth 40 cents per pound to flour worth 20 cents per pound. How many pounds of each did he use to make a mixture of 25 pounds to sell at 32-cents per pound?

(A) Let x = the number of pounds of the 40-cent per pound flour.
(B) Let y = the number of pounds of the 20-cent per pound flour.
(C) Then 40x + 20y = 32(25)
(D) x + y = 25
(E) 20x + 20y = 20(25)
(F) (40x + 20y) - (20x + 20y) = 32(25) - 20(25)
(G) 20x = 300
(H) .˙. x = 15
(I) y = 10
(J) Answer: 15 pounds of the 40-cent per pound flour.
(K) 10 pounds of the 20-cent per pound flour.
(L) Proof: $.40(15) + $.20(10) = $.32(25)
(M) $6.00 + $2.00 = $8.00
(N) .˙. $8.00 = $8.00

Another check for proof:

(O) Value of 15 pounds of flour at 40-cents per pound = $6.00
(P) Value of 10 pounds of flour at 20-cents per pound = $2.00
(Q) Total value..... $8.00
(R) Value of 25 pounds (mixture) at 32-cents per pound = $8.00

The following five points of information are given in the Mixture Problem:

1. The total weight of the mixture is 25 pounds.
2. The total price of the mixture is $8.00.
3. The price of each pound of the mixture is 32-cents.
4. The mixture contains two kinds of flour; one kind of flour costs 40 cents per pound; the other kind of flour costs 20 cents per pound.
5. The total mixture contains 25 pounds @ 32-cents per pound.

Hello, look at the Mixture Problem at the top of your sheet of paper. Today, we are going to solve the Mixture Problem by using two variables. The two variables re named x and y. The Mixture Problem is printed on the top of your sheet of paper. Your sheet explains how to solve the Mixture Problem. You should look at the printed Mixture Problem at the top of your sheet of paper.

I shall read the Mixture Problem to you:

> A baker added flour worth 40-cents per pound to flour worth 20-cents per pound. How many pounds of each did he use to make a mixture of 25 pounds to sell at 32-cents per pound?

The objective of this tape is to help you analyze the completed method which is printed on your sheet of paper. We shall adopt the line by line sequence whenever possible. Each line in this printed completed method is identified by the following capital letters: A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q,R: eighteen in all.

Look at Line "A". Now, I shall read each line for you starting at Line "A".

Line "A"- Let x = the number of pounds of the 40-cent per pound flour.

Line "B"- Let y = the number of pounds of the 20-cent per pound flour.

Line "C"- Then forty multiplied by x plus twenty multiplied by y equals thirty-two multiplied by twenty-five.

Line "D"- $x + y = 25$

Line "E"- Twenty multiplied by x plus twenty multiplied by y equals twenty multiplied by twenty-five.

Line "F"- Forty multiplied by x plus twenty multiplied by y minus twenty multiplied by x plus twenty multiplied by y equals thirty-two multiplied by twenty-five minus twenty multiplied by twenty-five.

Line "G"- Twenty multiplied by x equals three hundred.

Line "H"- Therefore, x equals fifteen.

Line "I"- $y = 10$

Line "J" and Line "K" is the answer.

Now, I shall read Line "J" and Line "K"; which is the answer.

Line "J"- Answer: 15 pounds of the 40-cent per pound flour

Line "K"- (Which is also part of the answer) Again, Line "K"- 10 pounds of the 20-cent per pound flour

Line "L"- Proof: Forty-cents multiplied by fifteen plus twenty-cents multiplied by ten equals thirty-two cents multiplied by twenty-five.

Line "M"- Six dollars plus two dollars equals eight dollars.

Line "N"- Therefore, eight dollars equals eight dollars.

Another check for proof:

Line "O"- Value of 15 pounds of flour at 40-cents per pound = $6.00

Line "P"- Value of 10 pounds of flour at 20-cents per pound = $2.00

Line "Q"- Total Value..... = $8.00

Line "R"- Value of 25 pounds (mixture) at 32-cents per pound = $8.00

The Algebraic Problem Solving Process is identified and described by the following lines: A,B,C,D,E,F,G,H,I,J,K: eleven in all. Obviously, when you have completed Line "J" and Line "K" the answer is completed: the lines following the answer are checks for proof.

Look at the Mixture Problem at the top of your sheet of paper. How much key information did you get by reading the Mixture Problem? It is desirable to see clearly the following five key information points. The following five key information points are given in the Mixture Problem. Keep looking at the Mixture Problem while I identify the five key information points-see if you can recognize the following key information while you are looking at the Mixture Problem.

The following five points of information are given in the Mixture Problem:

1. The total weight of the mixture is 25 pounds.
2. The total price of the mixture is $8.00.
3. The price of each pound of the mixture is 32-cents.
4. The mixture contains two kinds of flour.
5. The total mixture contains 25 pounds @ 32-cents per pound.

Now, look at the double dotted line at the bottom of your sheet of paper.

I shall read to you the information below the double dotted line:

The following five points of information are given in the Mixture Problem:

1. The total weight of the mixture is 25 pounds.
2. The total price of the mixture is $8.00.
3. The price of each pound of the mixture is 32-cents.
4. The mixture contains two kinds of flour; one kind of flour costs 40 cents per pound; the other kind of flour costs 20 cents per pound.
5. The total mixture contains 25 pounds @ 32-cents per pound.

Yes, these five information points are given in the Mixture Problem.

Now, I shall read the Mixture Problem to you:

A baker added flour worth 40-cents per pound to flour worth 20-cents per pound. How many pounds of each did he use to make a mixture of 25 pounds to sell at 32-cents per pound?

Now, I shall read the question part of the Mixture Problem to you:

How many pounds of each did he use to make a mixture of 25 pounds to sell at 32-cents per pound?

That question must be answered. It is very important to read the question very, very, carefully.

Look at Line "C". Now, I shall read Line "C".

Line "C". Then 40 cents multiplied by 15 plus 20 cents multiplied by 10 equals 800 cents or $8.00.

I repeat, then 40 cents multiplied by 15 plus 20 cents multiplied by 10 equals 800 cents or $8.00.

Line "C". The number 40 on the left side of line "C" = 40 cents.

The number 20 on the left side of line "C" = 20 cents.

The number 32 on the right side of line "C" = 32 cents.

The number 25 on the right side of line "C" = 25 pounds.

The number x on the left side of line"C" = 15 pounds.

The number y on the left side of line "C" = 10 pounds.

Look at line "C". The right side of line "C" = 800

Look at line "E". The right side of line "E" = 500

Look at line "A". Now, I shall read each line for you starting at line "A". In this reading I shall substitute the number 15 for "x" and I shall substitute the number 10 for "y".

Again, I shall read each line to you starting at line "A". Look at line "A".

Line "A"- Let x = the number of pounds of the 40-cent per pound flour.

Line "B"- Let y = the number of pounds of the 20-cent per pound flour.

Line "C"- Then forty cents multiplied by x plus twenty cents multiplied by y equals thirty-two cents multiplied by twenty-five.

Line "D"- x + y = 25

Line "E"- Twenty multiplied by x plus twenty multiplied by y equals twenty multiplied by twenty-five.

Line "F"- Forty multiplied by x plus twenty multiplied by y minus twenty multiplied by x plus twenty multiplied by y equals thirty-two multiplied by twenty-five minus twenty multiplied by twenty-five.

Line "G"- Twenty multiplied by x equals three hundred.

Line "H"- Therefore, x = 15

Line "I"- y = 10

Line "J" and Line "K" is the answer.

Again, Line "J"- Answer: 15 pounds of the 40-cent per pound flour

Line "K"- (Which is part of the answer) again, Line "K"- 10 pounds of the 20-cent per pound flour

Line "L"- Proof: Forty-cents multiplied by fifteen plus twenty cents multiplied by ten equals thirty-two cents multiplied by twenty-five.

Line "M"- Six dollars plus two dollars equals eight dollars.

Line "N"- Therefore, eight dollars equals eight dollars.

Another check for proof:

Line "O"- Value of 15 pounds of flour at 40-cents per pound = $6.00

Line "P"- Value of 10 pounds of flour at 20-cents per pound = $2.00

Line "Q"- Total Value..... = $8.00

Line "R"- Value of 25 pounds (mixture) at 32-cents per pound = $8.00

Look at line "A". Look at the word "let". We are going to study the meaning of the word "let". The word "let" means the following: "I agree to allow". The following four words: "I agree to allow" have the same meaning as the word "let".

I'm going to substitute the following four words "I agree to allow" for the word "let" in line "A" and line "B".

Now, I shall read line "A" and line "B".

Line "A". I agree to allow "x" to = the number of pounds of the 40-cent per pound flour.

Line "B". I agree to allow "y" to = the number of pounds of the 20-cent per pound flour.

Now, we can see that the word "let" contains the following condition: "I agree to allow".

The following is a very important concept.

From the agreed conditions contained in line "A" and line "B" flows the word "then" in line "C".

In short the agreed conditions that are contained in line "A" and line "B" are necessary in order to create line "C". Line "C" was developed from line "A" and line "B".

Look at line "C". The thirty-two multiplied by twenty-five on the right side of line "C" was derived from the question part of the mixture problem. Thirty-two multiplied by twenty-five means thirty-two cents multiplied by twenty-five (or twenty-five pounds at thirty-two cents per pound).

Look at line "C". The 40x in line "C" was derived from line "A". The 20y in line "C" was derived from line "B". The thirty-two multiplied by twenty-five in line "C" was derived from the question part of the mixture problem. You should keep looking at line "C".

40x is the same as 40 multiplied by x.

40x is the same as 40-cents multiplied by x number of pounds.

40x is the same as x number of pounds @ 40-cents per pound.

40x is the same as 40 cents multiplied by 15.

40x is the same as 15 pounds @ 40-cents per pound.

40x is the same as 600 cents.

40x is the same as $6.00.

You should still be looking at Line "C".

20y is the same as 20 multiplied by y.

20y is the same as 20-cents multiplied by y number of pounds.

20y is the same as y number of pounds @ 20-cents per pound.

20y is the same as 20 cents multiplied by 10.

20y is the same as 10 pounds @ 20 cents per pound.

20y is the same as 200 cents.

20y is the same as $2.00.

You should still be looking at line "C".

Look at the right side of line "C".

Thirty-two multiplied by twenty-five is the same as thirty-two cents multiplied by twenty-five.
Thirty-two multiplied by twenty-five is the same as twenty-five pounds at thirty-two cents per pound.
Thirty-two multiplied by twenty-five is the same as eight hundred cents.
Thirty-two multiplied by twenty-five is the same as eight dollars.

Line "C" is a very important equation.

The x in line "C" means: "number of pounds".

The y in line "C" means "number of pounds".

The 25 in line "C" means 25 pounds.

x number of pounds plus y number of pounds = 25 pounds

In short x + y = 25

Read line "D". x + y = 25

Line "D" was derived from line "C".

Look at line "E". Line "E" was developed from line "D".

Look at line "C". The 20y in line "C" has to be cancelled-out in order to isolate the x variable.

Look at line "D". Both sides of line "D" have to be multiplied by 20.

Look at line "E". Line "E"is the result of multiplying line "D" by 20.

Again, look at line "E". The 20y in line "E" makes it possible to cancel-out the 20y of line "C".

Look at line "F". Line "F" is where the "y" variable is cancelled-out. Line "F" Tells you to subtract both sides of line "E" from both sides of line "C".

Again,look at line "F". If you simplify the left side of line "F"you will obtain 20x.

If you simplify the right side of line "F"you will obtain 300.
This 300 represents the right side of line "G".

The 20x represents the left side of line "G".

Look at Line "G". The $20x = 300$ was obtained by simplifying Line "F".

Look at Line "H". Line "H" was obtained by dividing Line "G" by 20.

Look at Line "I". Line "I" was obtained by subtracting 15 from 25.

Line "J" and Line "K" is the answer.

I shall conclude this analysis by reading the answer to you. Now, I'm going to read Line "J" and Line "K"-which is the answer.

Line "J"- Answer: 15 pounds of the 40-cent per pound flour.

Line "K"- (which is part of the answer) Again, Line "K"- 10 pounds of the 20-cent per pound flour.

The number 15 contained in Line "J" is the value of x.

The number 10 contained in Line "K" is the value of y.

I shall conclude this analysis by asking you to develop enthusiasm for studying the smallest mathematical symbol. This developed enthusiasm will help you enter the "world of thought".

I wish to thank you for your kind attention. I tried to make this analysis interesting. We have now come to the end of this tape.